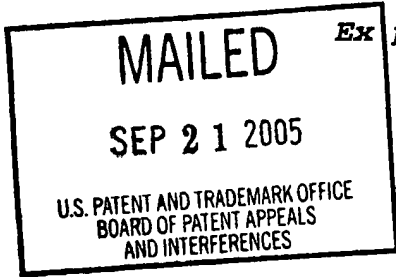


The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES



*Ex parte* LU YOU, FEI WANG, and MINH VAN NGO

Appeal No. 2005-2177  
Application No. 09/785,445

ON BRIEF

Before BARRETT, GROSS, and MACDONALD, *Administrative Patent Judges*.  
GROSS, *Administrative Patent Judge*.

**DECISION ON APPEAL**

This is a decision on appeal from the examiner's final rejection of claims 3 and 4.

Appellants' invention relates to a semiconductor device. Claim 4 is illustrative of the claimed invention, and it reads as follows:

4. A semiconductor device, comprising:
  - a first metallization layer;
  - a first diffusion barrier layer disposed on and contacting said first metallization layer;
  - a second etch stop layer disposed on and contacting said first diffusion layer;

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a first etch stop layer disposed on and contacting said second etch stop layer;

a dielectric layer disposed on and contacting said first etch stop layer;

a via extending through said dielectric layer, said first etch stop layer, said second etch stop layer and said first diffusion barrier layer, wherein said second etch stop layer has a thickness of at least 50 angstroms to about 120 angstroms.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

|                    |           |  |
|--------------------|-----------|--|
| Li et al. (Li)     | 6,331,479 | Dec. 18, 2001<br>(filed Sep. 20, 1999) |
| Zhou et al. (Zhou) | 6,475,810 | Nov. 05, 2002<br>(filed Aug. 10, 2000) |

Claim 4 stands rejected under 35 U.S.C. § 102(e) as being anticipated by Zhou.

Claim 3 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Zhou in view of Li.

Reference is made to the Examiner's Answer (mailed October 20, 2004) for the examiner's complete reasoning in support of the rejections, and to appellants' Brief (filed July 29, 2004) and Reply Brief (filed December 17, 2004) for appellants' arguments thereagainst.

**OPINION**

We have carefully considered the claims, the applied prior art references, and the respective positions articulated by appellants and the examiner. As a consequence of our review, we will reverse both the anticipation rejection of claim 4 and also the obviousness rejection of claim 3.

"It is axiomatic that anticipation of a claim under § 102 can be found only if the prior art reference discloses every element of the claim." *In re King*, 801 F.2d 1324, 1326, 231 USPQ 136, 138 (Fed. Cir. 1986). *See also Lindemann Maschinenfabrik GMBH v. American Hoist and Derrick*, 730 F.2d 1452, 1458, 221 USPQ 481, 485 (Fed. Cir. 1984).

If the prior art reference does not expressly set forth a particular element of the claim, that reference still may anticipate if that element is "inherent" in its disclosure. To establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 U.S.P.Q.2d 1746, 1749 (Fed. Cir. 1991).

*In re Robertson*, 169 F.3d 743, 49 USPQ2d 1949, 1951 (Fed. Cir. 1999). "Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not

sufficient." *Continental Can*, 948 F.2d at 1269, 20 USPQ2d at 1749 (quoting *In re Oelrich*, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981)).

The examiner asserts (Answer, pages 3-4) that Zhou's lower interconnect 14 is the claimed first metallization layer, Zhou's organic stop 16 is the first diffusion barrier layer, Zhou's passivation layer 18 is the second etch stop layer, Zhou's dielectric layer 20 is the first etch stop layer, Zhou's etch stop 22<sup>1</sup> is the dielectric layer, and Zhou's via 32 is the claimed via. The examiner takes the position (Answer, page 5) that it is known that an etch stop layer can function as a diffusion layer, and that appellants have not provided any evidence that the etch stop layer of Zhou cannot function as the claimed diffusion layer.

Appellants argue (Brief, page 5) that the examiner has failed to give weight to the terms "diffusion barrier," "etch stop," and "dielectric" as they are used in the claims. Specifically, appellants contend (Brief, page 7) that "there is no factual basis that supports a finding that one skilled in the art would recognize that the organic stop layer 16 of Zhou is a

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<sup>1</sup> Appellants indicate on page 5 of the Brief that although the examiner designated layer 24, in a telephone interview, the examiner asserted that the cited layer should have been layer 22.

diffusion barrier layer." Appellants similarly assert (Brief, page 7) that "there is no factual basis that supports a finding that one skilled in the art would recognize that the dielectric layer 20 of Zhou corresponds to the claimed etch stop layer or that the etch stop layer 22 of Zhou corresponds to the claimed dielectric layer," particularly since Zhou specifies the functions of the disclosed layers.

We agree with the examiner that a prima facie case of anticipation has been established with respect to the etch stop layer and the dielectric layer, but not with respect to the diffusion barrier layer. Regarding the etch stop layer, Zhou's dielectric layer 20 is formed of the same material (silicon dioxide) as disclosed by appellants for the first etch stop layer. Further, the layer is under layer 22 of silicon nitride, just like appellants' dielectric layer. Thus, even though the layers in Zhou have been designated as having particular functions, in the absence of evidence to the contrary, the skilled artisan would expect the same materials in the same order inherently to function the same way. However, Zhou's organic stop layer is not formed of the same materials as appellants' diffusion barrier layer, nor is it disclosed as having a diffusion barrier function. Although the examiner (Answer, page

5) is correct that diffusion barrier layers often may also function as etch stop layers, the examiner has provided no evidence that would suggest that Zhou's organic stop layer can also function as a diffusion barrier layer. Therefore, on this record, we have no reason to believe that the organic stop layer also functions as a diffusion barrier layer. Accordingly, Zhou fails to disclose each and every element of claim 4, and we cannot sustain the anticipation rejection of claim 4. We note, however, that if it were known in the art that organic etch stop layers also function as diffusion barrier layers, the outcome would be different.

Regarding the obviousness rejection of claim 3, the examiner (Answer, page 4) recognizes that Zhou fails to disclose the second etch stop layer includes silicon oxide. The examiner asserts that Li discloses a second etch stop layer includes silicon carbide, silicon oxynitride, or silicon oxide. The examiner proposes substituting silicon oxide for Zhou's silicon carbide or silicon oxynitride since Li indicates that they are interchangeable.

Appellants point out (Brief, page 8) that Zhou's element 20 (which the examiner points to as the first etch stop layer) is made of silicon oxide. Appellants argue (Brief, page 9) that

"the second etch stop layer acts to stop the etching process after the first etch stop layer has been etched. However, if feature 18 of Zhou (i.e., the alleged second etch stop layer) is modified to be formed from silicon oxide, as suggested by the Examiner," then layer 18 could not act to stop the etching of layer 20, since layer 20 is also silicon oxide. We agree with appellants. The substitution proposed by the examiner would not allow the second etch stop layer to function as an etch stop. Therefore, for the reasons provided *supra* with regard to claim 4, in addition to those just set forth, we cannot sustain the obviousness rejection of claim 3.

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## CONCLUSION

The decision of the examiner rejecting claim 4 under 35 U.S.C. § 102(e) and claim 3 under 35 U.S.C. § 103(a) is reversed.

**REVERSED**

*Lee E. Barrett*  
LEE E. BARRETT  
Administrative Patent Judge

*Anita Pellman Gross*  
ANITA PELLMAN GROSS  
Administrative Patent Judge

BOARD OF PATENT  
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INTERFERENCES

ALLEN R. MACDONALD  
Administrative Patent Judge

APG/vsh



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